PROCEDURE FOR CALCULATING LAKE VOLUMES TO A DEPTH OF TEN FEET FOR PROPOSED FLURIDONE TREATMENTS

This is the standard procedure used to calculate the volume of water within the upper 10-feet of a lake and to determine the appropriate application amount of aqueous solution of fluridone (Sonar A.S.® and AVAST!™). The goal of this procedure is to achieve rapid and uniform distribution of a given fluridone concentration by treating water within the 0-5 foot depth contour and those areas with depth greater than 5 feet separately with different amounts of fluridone. This procedure determines the amount of product necessary to treat an entire lake to a depth of 10 feet at a given concentration. An example is presented for calculating a concentration of 5 ppb fluridone applied to a lake that has a surface area (0-foot) of 239 acres, an area of 189 acres at the 5-foot depth contour, and 71 acres at the 10-foot depth contour. A1, A2, and A3 represent the areas for those depth contours, respectively.

Volume Calculations

STEPS

1. Determine the surface acres of the 0-, 5-, and 10-foot depth contours.

   Example: 0-, 5-, and 10-foot depth contours are 239, 189, and 71 acres, respectively.

2. Use the following formula for calculating the volume of a frustum for the lake between the surface (0-foot) and 5-foot depth contours.

   V (acre-feet) = h/3 (A1 + A2 + [sq. rt. (A1 x A2)])

   Where: V = volume, h = height of the water column in feet, A1 = area of the lake surface in acres, and A2 = area of the 5-foot contour in acres.

   Example: The volume of water to the 5-foot depth contour = 5/3 (239 + 189 + [sq. rt. (239 x 189)]) = 1069 acre-feet

3. Multiply the area of the 5-foot contour by 5 feet.

   Example: 189 acres x 5 feet = 945 acre-feet

4. Subtract Step 3 from Step 2 to calculate the volume of water in the 0- to 5-foot "donut" area.

   Example: 1069 acre-feet – 945 acre-feet = 124 acre-feet

5. Multiply Step 4 by 2.72 (pounds of the active ingredient fluridone in a one part per million solution in an acre-foot of water). Then multiply that value by the target concentration in parts per **million,** not in parts per billion. One quart of product (Sonar A.S.® or AVAST!™) contains one pound of the active ingredient fluridone.

   Example: At 5 ppb; 124 acre-feet x 2.72 x 0.005 = 1.7 pounds of fluridone or 1.7 quarts of product (Sonar A.S.® or AVAST!™).

6. Enter the 5- and 10-foot depth contour areas into the volume formula for a frustum as presented in Step 2 to find the volume of water between the 5- to10-foot contours.

   Example: V = 5/3 (189 + 71 + [sq. rt. of (189 x 71)]) = 628 acre-feet.

7. Add the values calculated for Steps 3 and Step 6 to determine the volume of the "donut hole" area from the 5-foot depth contour to the lake bottom.

   Example: (628 acre-feet + 945 acre-feet = 1573 acre feet

8. Multiply Step 7 by 2.72 (pounds of the active ingredient fluridone in a one part per million solution in an acre-foot of water). Then multiply that value by the target concentration in parts per **million,** not in parts per billion. One quart of product (Sonar A.S.® or AVAST!™) contains one pound of the active ingredient fluridone. This quantity of product is then distributed in the greater than 5 foot “donut hole” area.

   Example: At 5 ppb; 1573 acre-feet x 2.72 x 0.005 = 21.4 pounds of fluridone or quarts of product (Sonar A.S.® or AVAST!™).

9. Add the values in Steps 5 and 8 to obtain the total amount of product necessary to treat the lake to a depth of 10 feet at a given concentration.

   Example: At 5 ppb; 1.7 quarts + 21.4 quarts = 23.1 quarts of product.

Product Distribution

Distribute the product in the 0- to 5-foot depth contour “donut” area by zigzagging the boat within the water that is 0 to 5 feet deep as evenly as possible. Distribute the product in the water deeper than 5 feet (the “donut hole”) in a crisscross pattern.

Distributions are best when each of these areas are broken into smaller sectional areas and just the amount of product used for that subsection is placed in the mixing tank. However, this requires additional calculations for the respective subsections.